PILOT BUTTE CANAL
(Old Pilot Butte Canal)
(O.P.B.C. Lateral)
Scott Ave. vicinity
Bend
Deschutes County
Oregon

HAER No. OR-62

HAER
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9-BEND,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Columbia Cascades Support Office
National Park Service
909 First Avenue
Seattle, Washington 98104-1060

HAER
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HISTORIC AMERICAN ENGINEERING RECORD

PILOT BUTTE CANAL
(Old Pilot Butte Canal and O.P.B.C. Lateral)

HAER No. OR-62

Location: Deschutes River, near Scott Avenue
Bend
Deschutes County
Oregon

USGS Bend Quadrangle, Universal Transverse Mercator
Coordinates: 10.635756.487895

Date of Construction: 1904

Engineer: Levi D. Wiest, Irrigation Engineer

Builder: Deschutes Irrigation and Power Company

Present Owner: Central Oregon Irrigation District
847 S.W. 6th
Redmond, Oregon 97756

Present Use: Irrigation Facility

Significance: Construction and completion of the Pilot Butte Canal in 1904 introduced irrigation to Central Oregon and contributed to the settlement, growth and creation of the city of Bend. Although several other private irrigation companies had incorporated and were planning irrigation canals, Drake's Pilot Butte Development Company and its successor, the Deschutes Irrigation and Power Company, were the first to complete a major irrigation canal in Central Oregon. This canal also is associated with Bend's founder A.M. Drake. (No other building or structure associated with Drake has survived in Bend.) The canal is also connected to irrigation proponent Charles C. Hutchinson and early Bend homesteader and irrigation pioneer L.D. Wiest.

Report Prepared By: Oregon Department of Transportation

Date: May 26, 1998

I. DESCRIPTION

The Pilot Butte Canal, constructed in 1904, is a narrow, relatively shallow open ditch bordered by heavy vegetation. The canal averages about six feet in width and three feet in depth. In the area of the Bend Parkway project, the canal is open and uncovered from the Burlington Northern right of way, south to Sullivan Place (Fig. 1). Outside of this area the canal is carried below ground in a pipe. The canal travels through a culvert under Scott Avenue, N.E. The waterway extends about six miles north and eastward from the Deschutes River.

The entire length of the Pilot Butte Canal has not been examined. However, the uncovered section of the six-mile long canal appears to retain the full integrity of the as-built resource and is a representative segment of the original construction. No other associated irrigation features are present except the canal cut. The Pilot Butte Canal, originally diverted directly from the Deschutes River, is now a lateral of the Deschutes Irrigation and Power Co. (D.I.P.) Canal (Central Oregon Irrigation Canal) (HAER No. OR-63) and originates at a concrete diversion headwall with a waterman canal gate at approximately 0.5 miles northward up the D.I.P. Canal. The diversion for the D.I.P. Canal is located south of Bend near river mile 171 on the Deschutes River.

II. HISTORIC CONTEXT

Early Irrigation in Oregon

According to Corning's Dictionary of Oregon History (2nd Edition 1989), small scale irrigation began in Oregon in 1852 when Jacob Wayner and a man named Thornton constructed what was probably the first irrigation ditch in Oregon on the Rogue River near the present-day community of Talent. In 1857-58, the Courtney brothers dug irrigation ditches across the Umatilla Meadows near Hermiston. Sometime in the 1850s, a narrow 15-mile diversion ditch carried the waters of Mill Creek, near The Dalles, to the agricultural lands of Wasco County. Early Baker County residents recall that ditches such as the Eldorado Ditch, dug for placer mining in the area during the 1870s, were continued in use as irrigation ditches after the gold was mined and agricultural practices begun.

As early as 1877 private enterprise in central and eastern Oregon was encouraged by Congress through the Desert Land Act, which provided for the sale of lands in units of 640 acres. Settlers were able to purchase their holdings at $1.25 an acre and were expected irrigate it within three years. A further incentive was the Carey Act of 1894, which gave Oregon a million acres of desert land, with grants to individuals of 160 acres.

The Carey Act represented a transition from total reliance on private irrigation development in the 19th century to 20th-century practice in which the federal government took almost total responsibility for some irrigation developments. Under the Carey Act, western states were encouraged to organize large-scale irrigation projects by finding private entrepreneurs to build the

necessary dams and canals, and to sell land to settlers who would in turn buy water from private developers. Although private investors found western irrigation attractive, sufficient capital could not be attracted to undertake a large number of projects (Quivik and Hess 1989).

One of the state's earliest cooperative irrigation projects was begun to serve fruit growers in Hood River around the turn of the century. In 1902, by authority of the Federal Reclamation Act of that year, the Umatilla project was established. This irrigation system was built in 1904-1908, and included an area of 17,000 acres lying along the south bank of the Columbia River and east of the Umatilla River. Water to irrigate 10,000 acres was diverted from the Umatilla near Echo and stored in the Cold Springs Reservoir, 24.5 miles to the north.

The Federal Reclamation Act also authorized the Klamath irrigation project, with work beginning in 1903, to serve portions of the Klamath Basin. In 1904, the Deschutes Irrigation and Power Company, through the Pilot Butte Canal, brought water to arid acres in the newly platted city of Bend in central Oregon. Similar developments were the Hermiston (1921), Owyhee (1926), Burnt River Valley (1938), Stanfield (1933-1935), and Vale (1926) projects, and a larger Owyhee project and dam (1938) (Corning 1989). While as early as 1914 a total of 1,000,000 acres were listed within irrigation projects, a 1930 survey calculated 898,713 acres actually irrigated in cooperative, private, and Federal and local irrigation districts.

Until March 1907 all irrigation projects operated under the Reclamation Service of the Geological Service, U.S. Department of the Interior. After that, the Reclamation Service became a separate agency and oversaw projects until 1923. The U.S. Bureau of Reclamation was created as a separate department in the early 1930s.

Irrigation Development in the Bend Area

The availability of irrigation played a significant role in the early development of Bend and the settlement of communities around Bend. The formation of irrigation districts, the damming the Deschutes River and building of canals were events which shaped and continue to affect Central Oregon. The Deschutes River Basin is about 75 miles long and 30 miles wide and with its tributaries it drains about 9,000 square miles. Mean annual precipitation of Bend is about 12 inches, which falls primarily as snow in the winter months. As the growing season is short, irrigation is essential for successful farming in this arid, high desert area.

Early settlers were not initially attracted to the Deschutes Basin, choosing instead the promising land west of the Cascade Mountains where there was more rainfall. The earliest agricultural use of the Deschutes Basin was for grazing cattle. Local stockmen who began settling in the area around 1870 used the Basin's open range, as did Willamette Valley ranchers who moved to the Deschutes watershed for summer range. In the 1880s transcontinental railroads brought sheepmen and a few farmers who competed with cattlemen for use of the land. Stands of timber along the eastern front of the Cascades attracted loggers and several sawmill developers. Yet, by the turn of the 20th century, the Deschutes Basin remained largely undeveloped for uses other than stock grazing (Quivik and Hess 1989).

Long before thousands of Central Oregon acres were transformed through a system of canals, irrigation was practiced on a very small scale in the present Bend area. Diverted through ditches dug not far from the river's banks, water was used to irrigate gardens of several ranches that bordered the river, and to cultivate small tracts of alfalfa.

The General Land Office divided the Deschutes River Basin into two units. These units are important in understanding the names of some of the later canal systems. The first to be developed was the South Unit, upstream of the canyon, in present Deschutes County. The North Unit, downstream of the Crooked River Canyon in what is now Jefferson County, was developed last.

The earliest filing of water rights on the Deschutes River was by Cline Falls Power Company in January 1892, although the filing was intended to provide hydroelectric energy rather than irrigation water. Probably the first diversion of Deschutes water for irrigation purposes in the Bend area occurred before 1893 on the "Dutch John" Felderworst homestead. Locating on the east bank of the Deschutes upstream from the future site of Bend and where the Brooks-Scanlon lumber mill began operation in 1915, Felderworst is believed to have been the first farmer to grow alfalfa in the immediate vicinity of present day Bend. On his acreage he cleared a bit of bottomland, built the canal that for years was known as the "Dutch John" ditch and grew alfalfa for several seasons.

Private irrigation was also practiced on a small scale on the W.H. Staats property. Water was taken from the Deschutes through use of a bucket mill which dumped the water into small ditches in a garden carefully cultivated by Mrs. Staats. The garden, not far from the Deschutes channel, supplied fresh vegetables for many years to stockmen on their way to and from mountain ranges in the late spring and early fall. At one time, the Staats's bucket irrigation system apparently supplied water to 10 or 12 acres. Upstream and also on the east side of the river, John Sisemore had a small ditch on his Farewell Bend ranch (Bend Bulletin 1953).

In 1893 organized irrigation began with the incorporation of the Three Sisters Irrigation Ditch Company, which designed a canal system to distribute and sell water from Tumalo Creek, north of present day Bend. In 1895 construction began on the Squaw Creek Irrigation Company's canal, and around 1900, other local, private irrigation companies began surveying the area for potential irrigation projects. Charles C. Hutchinson formed the Oregon Development Company in 1898 and filed on Deschutes water that spring. The Deschutes Reclamation and Irrigation Company (commonly called the Swalley), formed by Jim Benham, George W. Swalley, and others, was also incorporated in 1898. In 1902 the Pilot Butte Development Company entered into a contract with the State of Oregon for the reclamation of lands under the terms of the Carey Act. The Arnold Irrigation Company incorporated in 1904, followed four years later by the North Irrigation Company.

Only a small amount of Deschutes River water was diverted until Alexander M. Drake arrived in central Oregon in 1900. Drake purchased land, built a lodge and began the task of creating the town of Bend. (Bend was later platted in 1904 and officially incorporated in January 1905.) After Drake erected his summer lodge on the eastern bank of the Deschutes in 1900, he constructed

three pumping plants. One was at Staats; one was just below the present Tumalo Avenue Bridge; and one was a little further downstream. It was the third plant that supplied water to the Drake lodge. Because of the supply of water, the Drake's inn was equipped with a bath, a novelty in central Oregon at the time. Drake also founded the Pilot Butte Development Company which competed with Hutchinson's Oregon Irrigation Company for several years, until both companies sold to the Deschutes Irrigation and Power Company in 1904 (Clark 1985).

Water from the Deschutes also provided irrigation for "Garden Row," the residential section where prosperous Bend citizens lived in the city's early years. These homes, with their fine gardens and occasional lawn, were located between the present-day Tumalo Avenue and Drake Park bridges on the east side of the river (Bend Bulletin 1953).

The initial flurry of irrigation activity in the Bend area occurred from about 1904 to the mid-1910s. In July 1904 the Deschutes Irrigation and Power Company project began large-scale construction, building flumes and canals north and east. From the diversion point on the Deschutes, two main canals were constructed. One, the Central Oregon Canal (or later the Central Oregon Irrigation Canal), ran northeast toward the west side of Powell Butte; the other, the Pilot Butte Canal, pointed north toward Redmond. By this time, several irrigation companies had already moved toward consolidation. Drake and Hutchinson's companies sold to the Deschutes Irrigation and Power Company in 1904, which subsequently became the Central Oregon Irrigation Company in 1910. The Arnold Irrigation Company eventually absorbed the North Irrigation Company and others. By the 1930s, a number of other companies in the Deschutes Basin had also reorganized as irrigation districts.

The next major irrigation project, the North Unit Main or Deschutes Project, would not be dedicated until 1946, although work occurred intermittently over a period of years. The canal, 65 miles long, was designed to irrigate Jefferson County, although originating in Bend. At present, Deschutes water finds its way into six irrigation systems: the Swalley, Central Oregon Irrigation District, North Unit, Lone Pine, Arnold and Tumalo.

The canals continue to exist as a vital source of water for large acreages and thousands of customers. In 1978 the State Water Resources Department on the Deschutes Drainage Basin reported 58,540 irrigated agricultural acres (out of a total 1,785,302 acres).

Canal Construction Technology

Early Deschutes Irrigation and Power Company canals were built by hand and horse labor. Much of the excavation was done with horse-drawn scrapers. In areas of rock, typically early Pleistocene lava flows, workers pounded steel miners' drills with sledge hammers to create holes for blasting charges. After fuses - and later, detonators - had set off the blast, crews of men removed the loosened rock and shoveled and scraped the canal to grade and depth (Clark, Lecture Notes n.d.).

In November 1904, conditions for employees were considerably improved when the Deschutes Irrigation and Power Company purchased two portable steam boilers which were shipped from

Columbus, Ohio. One boiler was twenty horsepower, the other six; both provided power for operating rock drills. The larger boiler drove four drills; the smaller drove one. Together they could bore 400 feet a day in lava rock, where previously a rock crew of three men could bore only 18 or 20 feet a day. About 50 Italian laborers were brought in during September to bring the company's work force to 200 men and 100 teams (Vaughan 1981).

Early Central Oregon irrigation systems were facilitated by gravity pumping systems. These gravity systems derived their water supply through diversion of a river or stream, conveying the water in a network of canals or channels to the land to be irrigated. The diversion raised the water level to force the desired flow through a headgate into the head of a canal. This was usually accomplished by a diversion dam, or weir, across the watercourse. The character and cost of construction was determined by the topography. Hillsides too steep for open canal excavation required flumes supported by benches cut in the hillside, or concrete rectangular sections made with a retaining wall on the downhill side. Depressions were crossed with flumes or siphons. Ridges were tunneled through. From the highest point of the irrigable area, the main canal was constructed on a prominent ridge or along the higher boundary of the land to be irrigated. Lateral canals headed at the main canal and ran along commanding situations, usually down the ridges formed by irregularities of topography, to supply the sub-laterals and ditches, or distributaries, which delivered the water to each farm (Hall, 1994).

III. HISTORY OF THE PILOT BUTTE CANAL

The Pilot Butte Canal is labeled on current maps as the O.P.B.C. Lateral, a name not readily identifying it as the most historically significant canal connected with the founding of Bend. Renamed the "Old" Pilot Butte Canal (O. P. B. C.) after the North Canal/Pilot Butte Canal was built in 1912, the canal carries the name of Bend founder A.M. Drake's Pilot Butte Company. Drake's arrival in Bend in 1900 marked the end of the open range era and the start of the irrigation/agricultural epoch in Oregon.

C.C. Hutchinson interested Drake in the Farewell Bend country and its irrigation possibility. As president of the Oregon Irrigation Company, it was Hutchinson who first filed water rights on an irrigation segregation on the Deschutes River, but it was Drake's Pilot Butte Development Company that finally spread water over the lands near Bend (Bend Bulletin 1953).

Charles C. Hutchinson formed the Oregon Development Company in 1898 and filed on Deschutes water that spring. Hutchinson was on the Deschutes with engineers making surveys and water filings two years before the wealthy Minneapolis capitalist, Drake, appeared in 1900. When Hutchinson needed capital, in 1899 he wrote to Drake at Spokane, informing him of the potential profits in prospect. Drake was offered half of the company stock, conditional on his contribution of capital, in exchange for his participation as president and manager of the organization. Drake agreed to the terms and paid for the necessary surveys. About two months afterward, Drake informed Hutchinson that he saw no reason for a partnership venture, in effect elbowing Hutchinson aside. "You have no interest here and nothing to sell," Drake told Hutchinson, who

labeled Drake a "disorganizer and blackmailer" in a letter to Congressman Malcolm Moody (Vaughan 1981).

Drake's Pilot Butte Development Company and Hutchinson's Oregon Irrigation Company then proceeded to make new water filings, in two instances side by side. Hutchinson also wrote to Oregon's Binger Hermann, then commissioner of the General Land Office, pointing out that his prior filings on Deschutes water took preference over Drakes, effectively preventing Drake from complying with 1894 Carey Act regulations.

The squabble did not really delay development of irrigation. On May 31, 1902, Drake's company entered into a contract with the State of Oregon to reclaim nearly 85,00 acres under the terms and provisions of the Carey Act. In 1903 Secretary of the Interior Hitchcock affirmed a General Land Office dismissal of Hutchinson's complaints and recognized the legitimacy of the Pilot Butte Company claim. Local sentiments were strongly with Drake, probably because he had the money to invest in development, while Hutchinson did not (Vaughan 1981).

The proposed project was to irrigate the lands from a canal beginning three miles south of Bend, and continuing northward. It was also planned to provide water to the Bend village of 226 persons. Before work began, it was determined that a flume would be needed at the upper end of the project. To supply the lumber, a sawmill was built in 1903 by the Pilot Butte Company for the purpose of processing 30,000 board feet of lumber daily. Drake also researched the possibilities of the railroad entering the area. He contacted a stage company to appraise land along the irrigation ditch so he could construct a road for the settlers he expected to arrive the following spring.

In January 1904 the Pilot Butte Company sawmill burned. Soon after, the Deschutes Irrigation and Power Company began competing for water in the area, and, in April 1904, gold was discovered at Cline Butte. The discovery dealt a heavy blow to the Pilot Butte Company and made canal construction difficult. Laborers, teams and materials became difficult to obtain. However, by June assay reports on Cline Butte gold were so poor that prospectors were eager to return to work on the irrigation ditches (Vaughan 1981).

Before extensive construction occurred, the Pilot Butte Development Company sold its contract and all rights under it to the Deschutes Irrigation and Power Company on March 14, 1904. The following month the Pilot Butte Canal was finished and water reached two miles south of Bend in May 1904. The unique geologic qualities of the Upper Deschutes River Basin had created peculiar difficulties during construction. A month before completion a break occurred on the canal when water was turned in for testing purposes and suddenly disappeared into the earth in a giant vortex. The flow had apparently broken through an underground channel, an obstacle subsequently overcome by 215-foot flume built across the broken section (Hall, 1991).

The homestead of Deschutes Irrigation and Power engineer Levi D. Wiest was first watered from the Pilot Butte Canal in spring, 1904. The June 3, 1904 Bend Bulletin notes on page 1: "After about four years of work and the expenditure of terms of thousands of dollars, the soil back from

the river is slaking its thirst and pushing plant life in a surprising manner" (Vaughan 1981). Wiest, Bend's first irrigation engineer, had arrived in the area on August 15, 1900 and filed on a homestead, now the Wiestoria section of Bend. Wiest surveyed the Bend townsite and supervised the plowing of a furrow that marked the boundaries of the city (Bend Bulletin 1953).

In July 1904, the Deschutes Irrigation and Power Company began large-scale construction, building flumes and canals north and east. Two main canals were under construction. One, the Central Oregon Irrigation Canal, ran the 40-mile distance northeast toward Powell Butte. The other extended the Pilot Butte Canal northward in the general direction of Redmond. The company struggled until 1907 when it had completed the main canals and had entered into contracts with prospective settlers to irrigate about 27,000 acres (Clark 1985).

In 1910, the Deschutes Irrigation and Power Company became the Central Oregon Irrigation Company. This company (and others) established diversion canals from the North Canal Dam in 1910-1912 and extended a "new" Pilot Butte Canal to Redmond and beyond (HAER No. OR-61).

IV. PROJECT INFORMATION

This documentation was undertaken by the Researeh Unit of the Environmental Section of the Oregon Department of Transportation as a result of a proposed highway improvement project being undertaken by the Oregon Department of Transportation. Sections of the historic resource documented in this report are located within the boundaries of the Bend Parkway project and will be impacted in varying degrees by project construction. The Bend Parkway project defines a new route for the Dalles-California Highway (U.S. 97) through the city of Bend, Deschutes County, Oregon. It creates a new alignment for U.S. 97, removing it from its existing course along 3rd Street to one which, except for portions near the north and south ends of the project, closely follows Division Street (Fig. 2). The projeet area runs 6.9 miles. The new route will be a 4-lane limited-access facility with a raised median, shoulder/bike lanes and portions of sidewalks. Other features of the project include structures, signalized intersections and interchanges.

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